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Need to Control Discharges from Sewers Carrying Both Sewage and Storm Runoff (Rpt. to the Congress)

Comptroller General of the United States

Prepared for

Environmental Protection Agency, Washington, D C

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REPORT TO THE CONGRESS

Need To Control Discharges From Sewers Carrying Both Sewage And Storm Runoff

Environmental Protection Agency

[redacted]

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This is our report on the need to control discharges from sewers carrying both sewage and storm runoff. The Environmental Protection Agency has the primary responsibility for carrying out Federal environmental programs.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget; the Chairman of the Council on Environmental Quality; and the Administrator of the Environmental Protection Agency.

Elmer B. Staats

Comptroller General
of the United States

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ABBREVIATIONS

EDA	Economic Development Administration
EPA	Environmental Protection Agency
FHA	Farmers Home Administration
GAO	General Accounting Office
HUD	Department of Housing and Urban Development
OMB	Office of Management and Budget

GLOSSARY OF SEWAGE TREATMENT TERMINOLOGY

Biochemical oxygen demand is a measure of the strength of sewage in terms of the amount of oxygen required for bacteria to continually decompose waste.

Combined sewers carry both sewage and storm water runoff. During dry weather, combined sewers generally carry all the sewage to treatment plants; during storms, only part of the sewage and storm water is carried to the treatment plants, and the remainder is discharged, untreated, directly into waterways.

Infiltration occurs when ground water leaks or seeps into a sewer system through defective joints, ruptured or porous pipes or manholes, or other system appurtenances.

Pollution results when unwanted animal, vegetable, or mineral matter reaches water and makes it more difficult or dangerous to use for drinking, recreation, agriculture, industry or injurious for wildlife.

Primary sewage treatment is the use of filtering and sedimentation techniques to remove about 30 percent of biochemical oxygen-demanding wastes.

Sanitary sewers, in separate storm and sanitary sewer systems, carry only sewage.

Secondary sewage treatment is the use of biological processes to accelerate the decomposition of sewage and thereby reduce oxygen-demanding wastes by 80 to 90 percent.

Sewage includes domestic and industrial wastes discharged into municipal sewers.

Storm sewers, in separate systems, carry only storm runoff.

Tertiary sewage treatment may modify secondary treatment or may be a more complex procedure, such as additional chemical treatment, electrochemical processing, or carbon filtration.

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

NEED TO CONTROL DISCHARGES FROM SEWERS CARRYING BOTH SEWAGE AND STORM RUNOFF

Environmental Protection Agency
B-166506

D I G E S T

WHY THE REVIEW WAS MADE

Combined sewers carry domestic and/or industrial wastes at all times and, during storms or thaws, also carry water runoff from streets and adjacent areas. However, the combined sewers and the sewage treatment facilities into which combined sewers normally flow usually are not designed to handle the increased flows that can occur during storms.

To avoid overloading the sewers and the treatment facilities, combined sewers generally have diversion facilities which discharge both storm runoff and untreated sewage directly into rivers, streams, and other waterways.

In prior reviews of Federal and State efforts to abate and control water pollution, the General Accounting Office (GAO) noted that, in some cases, combined sewer discharges had a substantial adverse effect on water quality.

GAO reviewed Federal, State, and local efforts to abate and control discharges from combined sewers at (1) the Environmental Protection Agency (EPA) Headquarters in Washington, D.C., (2) EPA regional offices in Boston, Massachusetts; Chicago, Illinois; and San Francisco, California, (3) the State water pollution control and public health agencies in California, Connecticut, Illinois, Indiana, Massachusetts, and Rhode Island, and (4) 17 municipalities in the 6 States. EPA has the primary responsibility for carrying out Federal environmental programs, including abatement and control of water pollution.

FINDINGS AND CONCLUSIONS

Combined sewer discharges of untreated or inadequately treated sewage are a major pollution problem and prevent many areas from attaining Federal and State water quality goals. Because of these discharges, bathing beaches near densely populated areas and shellfish-harvesting areas have been closed.

In Rhode Island all municipalities on rivers that flowed into a bay had waste treatment facilities but three municipalities had combined sewers. During dry weather the water quality in most of the bay was adequate for harvesting shellfish. But after storms, water samples taken by the State water pollution control agency showed high bacterial counts, which a State official attributed to combined sewer discharges.

Because of these high bacterial counts, the State had been closing 9,451 acres of the bay to shellfish harvesting following storms. Between March 1969 and October 1971, the State closed that area of the bay 38 times for a total of 190 days.

Some communities had acted to abate combined sewer discharges and, as a

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MARCH 28, 1973

result, had obtained or expected to obtain substantial benefits, such as using the water for recreation. (See pp. 10 to 14.) Federal and State water pollution control agencies, however, have placed little emphasis on abating and controlling combined sewer flows, primarily because of the high cost.

The American Public Works Association estimated the nationwide cost in 1967 to be $48 billion. In October 1972 EPA told GAO that, on the basis of the current construction cost index, the estimate had increased to $70 billion.

Most States reviewed lacked plans for abating and controlling combined sewer discharges. The States and municipalities did not have adequate information on (1) the extent of the problem, (2) alternative solutions and their costs, or (3) benefits to be obtained from its solution. In addition, limited funding was available for solving the problem. (See pp. 15 to 18.)

The Department of Housing and Urban Development and the Department of Commerce, as a condition for financing sewer construction, generally required municipalities to construct separate storm and sanitary sewers. These sewers were constructed, however, without considering alternative solutions. Only a small part of the muncipalities' combined sewer systems were separated.

Various other solutions include:

--Storage of the excess combined sewer flows for later treatment at a sewage treatment facility.

--System control devices which monitor and reroute excess flows through the sewers to use the maximum capacity of the sewers to store the flows for adequate treatment before discharge.

--Treatment of combined sewer flows without storage, which usually involves some type of screening and chlorination.

Separation may not be the best answer in all cases because the storm water is seldom treated, even though it can be a significant source of water pollution, and because it may not be the most cost-effective solution. Each municipality should consider the alternatives available before deciding on the method of controlling discharges from its combined sewers. (See pp. 11 and 19 to 21.)

In some instances EPA has funded projects to abate and control combined sewer discharges under its research, development, and demonstration grant program and its construction grant program. Generally, however, Federal funds have not been available for such projects.

EPA recently proposed a program to fund these projects on a limited scale, but the Office of Management and Budget rejected the proposal and said that there was insufficient evidence to demonstrate that the proposed project's benefits would offset the high cost. (See pp. 22 to 24.)

Control and abatement of combined sewer discharges is costly and could take many years to accomplish. Many municipal officials told GAO that without Federal or State financial assistance, they could not finance such projects.

Many municipalities could achieve substantial benefits by abating combined sewer discharges under a program of phased construction. The construction could be accomplished

as funds became available.

GAO believes that, in those cases where phased construction programs are developed by municipalities and approved by the States, EPA should consider awarding construction grants for the various phases. (See pp. 25 to 27.)

The Federal Water Pollution Control Act Amendments of 1972 (enacted October 18) (1) authorized $18 billion for fiscal years 1973-75 for Federal grants for construction of treatment facilities, (2) increased the Federal share of facilities costs, and (3) made eligible for Federal financial assistance such items as collection sewers, methods to deal with storm water runoff, projects to prevent combined sewer discharges, and studies of sewer systems and problems. The law requires the Administrator, EPA, to require the States to study and evaluate water quality control problems and alternative solutions before making grants available. (See pp. 27 and 28.)

RECOMMENDATIONS

The Administrator, EPA, should require

--States to identify all municipalities having combined sewer discharges,

--States and municipalities to study their combined sewer problems and the alternatives available on a municipality-by-municipality basis, and

--States and municipalities to develop and submit to EPA plans for control and abatement of the polluting discharges, including phased construction programs.

GAO recommends also that the Administrator, EPA, consider awarding construction grants for phased construction projects.

AGENCY ACTIONS AND UNRESOLVED ISSUES

EPA generally agreed with GAO and said that this report would help highlight obstacles to attaining water quality goals. EPA also stated that, with the Federal Water Pollution Control Act Amendments of 1972 and supporting appropriations as a basis, it will take action in line with GAO's recommendations.

The Office of Management and Budget, the Department of Commerce, the Department of Housing and Urban Development, and the six State water pollution control agencies also generally agreed. (See pp. 30 to 32.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

Although this report does not contain any recommendations for legislative action because of the enactment of the Federal Water Pollution Control Act Amendments of 1972, GAO is submitting this report to the Congress because of the seriousness of the combined sewer discharge problem.

CHAPTER 1

INTRODUCTION

Discharges from combined sewers are a major source of water pollution in the Northeast and Midwest. Combined sewers carry domestic and/or industrial wastes at all times and, during storms or thaws, also carry storm runoff from streets and other sources. The normal flows in combined sewers, relatively low and slow moving, permit a buildup of solids in the systems. During storms the flows can increase as much as 100 times the normal flow. The high flow and fast movement flush the buildup of solids from the sewers.

Sewers and sewage treatment facilities are usually designed to provide some excess capacity but not to handle the increased flows that can occur during storms. To avoid overloading the sewers and the treatment facilities, combined sewer systems generally include diversion facilities which allow part of the storm flow to be discharged directly into waterways. These diverted flows consist of a mixture of untreated sewage and storm runoff and are polluting discharges. Even when all, or a significant part, of the storm flows are routed through the treatment facilities, the facilities' efficiency may be severely reduced and the resultant effluents may be of lower quality than under dry weather conditions.

A 1967 report by the American Public Works Association stated that about 54 million people nationwide lived in municipalities partially or wholly served by combined sewer systems and that the Nation had about 55,000 miles of combined sewers.

As shown by the following illustration, combined sewers are particularly prevalent in the densely populated and highly industrialized areas of the Northeast and Midwest.

In prior reviews of Federal and State efforts to abate and control water pollution, we noted that, in some cases, combined sewer discharges had a substantial adverse effect on water quality and, unless controlled, could prevent the attainment of water quality goals.

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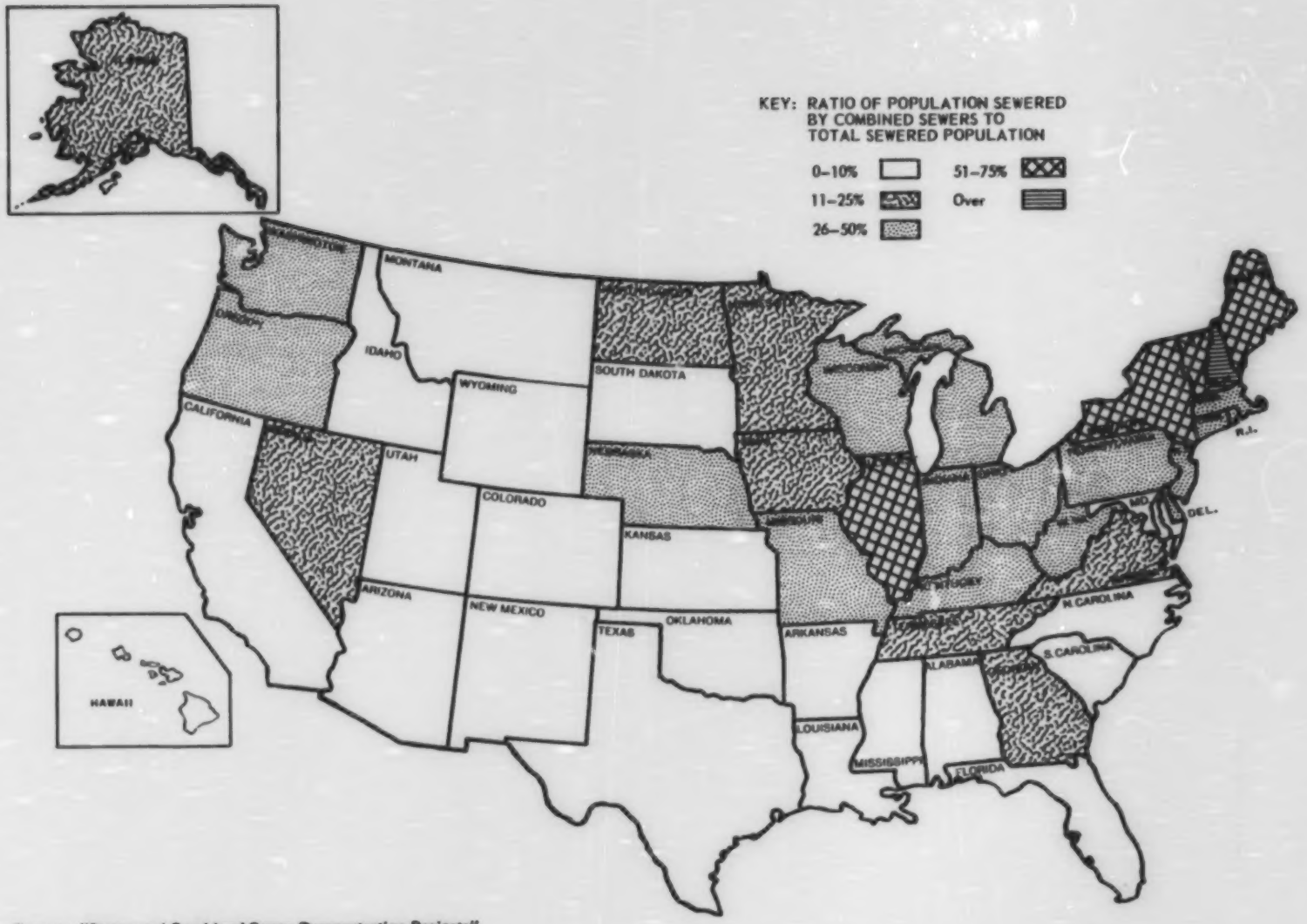

Source: "Storm and Combined Sewer Demonstration Projects" report by the Department of the Interior dated January 1970.

In our report to the Congress entitled "Examination Into the Effectiveness of the Construction Grant Program for Abating, Controlling, and Preventing Water Pollution" (B-166506, Nov. 3, 1969), we included as an appendix a report by a consulting engineering firm on the use of systems analysis as a means of planning for the construction of projects to abate and control water pollution. The firm concluded that:

> Combined sewer overflows [or discharges] constitute important sources of pollution and must be fully evaluated in establishing construction programs. Combined sewer overflows upstream of secondary or tertiary treatment works, defeat the accomplishments of such treatment to protect recreational uses of the water.
>
> Obviously, untreated combined sewer overflows affect, to some degree, the dissolved oxygen in the river, but the effect on the entire water quality of the river (floating solids, coliform bacteria, etc.) is considerable.

In a subsequent report to the Congress entitled "Alternatives to Secondary Sewage Treatment Offer Greater Improvements in Missouri River Quality" (B-125042, Jan. 6, 1972), we pointed out that rural runoffs and combined sewer discharges significantly decreased dissolved oxygen in the Missouri River.

SCOPE OF REVIEW

The purpose of this review was to examine Federal, State, and local efforts to abate and control discharges from combined sewers.

We conducted this review from January through December 1971 at (1) the Environmental Protection Agency (EPA)[1] headquarters in Washington, D.C., (2) EPA regional offices in Boston, Massachusetts; Chicago, Illinois; and San Francisco, California, (3) the State water pollution control and public

[1]See appendix I for a chronology of EPA and its predecessor agencies which had responsibility for the Federal water pollution control program.

health agencies in California, Connecticut, Illinois, Indiana, Massachusetts, and Rhode Island, and (4) 17 municipalities in the 6 States. (See app. II for a list of the municipalities included in our review.)

We examined EPA's policies, procedures, and practices concerning the planning for, and progress toward, control of this source of pollution. We also examined the alternatives for controlling pollution from combined sewers, their costs, and the benefits expected from controlling such pollution. We held discussions with officials of Federal, State, and local agencies and consulting engineering firms and reviewed their records.

FEDERAL CONSTRUCTION GRANT PROGRAMS

Federal agencies that provide financial assistance to municipalities for constructing sewers and treatment works, and thereby could have an impact on solutions to the combined sewer problem, follow.

--EPA, pursuant to the Federal Water Pollution Control Act, as amended (33 U.S.C. 1151), may award grants of up to 55 percent of total eligible costs to any State, municipality, or intermunicipal or interstate agency for constructing necessary treatment facilities, including interceptor sewers, to prevent untreated or inadequately treated sewage or other waste from being discharged into any waters. The Water Quality Act of 1965 (79 Stat. 903), which amended the Federal Water Pollution Control Act, authorized grants for demonstrating improved methods of treating wastes and controlling discharges from combined sewers.

--The Department of Housing and Urban Development (HUD) may award grants to municipalities for constructing new sewers and for rehabilitating and replacing existing sewers. Under HUD's urban renewal program (authorized by 42 U.S.C. 1453), grants of up to 75 percent of eligible costs may be awarded; under its basic water and sewer grant program (authorized by 42 U.S.C. 3101), grants of up to 50 percent of the eligible costs may be awarded.

--The Farmers Home Administration (FHA), Department of Agriculture, may award grants of up to 50 percent of eligible costs for constructing treatment works under its water and waste disposal systems for rural communities program (authorized by 7 U.S.C. 1926).

--The Economic Development Administration (EDA), Department of Commerce, may award grants of up to 50 percent of eligible costs for constructing sewers and treatment works under its public works and economic development facilities grant and loan programs (authorized by 42 U.S.C. 3131).

--The Department of Transportation (pursuant to 23 U.S.C. 319) may award grants of up to 90 percent of eligible costs for sewer construction under its highway construction programs.

Representatives of EPA, EDA, HUD, and FHA are members of an interagency committee which meets each month to coordinate and promote uniformity in providing Federal financial assistance for water, sewer, and waste treatment projects.

CHAPTER 2

ADVERSE EFFECTS OF COMBINED SEWER DISCHARGES

Combined sewer discharges of untreated or inadequately treated sewage are a major pollution problem in many areas of the country. These discharges have caused:

--Lowering of water quality below Federal and State standards.

--Closure of beaches.

--Health hazards at beaches that are not closed, even though bacteria levels exceed health standards.

--Closure of shellfish-harvesting areas.

--Health hazards when sewers back up and flood streets.

--Unsightly conditions of rivers, harbors, and bays because of floating sewage and debris.

During March 1970 hearings by the Subcommittee on Air and Water Pollution, Senate Public Works Committee, the Director, Association of Metropolitan Sewerage Agencies, stated that combined sewer discharges cause an estimated 40 to 50 percent of the pollution in all waterways in metropolitan areas. He said that, unless the problem was corrected, the public probably would not see benefits from any pollution abatement facilities now planned or recently built in metropolitan areas having combined sewers.

Officials of one State told us that during wet weather the State's municipalities having combined sewers cannot meet Federal and State water quality standards limiting the discharge of bacteria, solids, grease, scum, and other pollutants. They told us also that the uses established for certain waters, including swimming and shellfish harvesting, were curtailed during and immediately after periods of combined sewer discharges.

Some municipalities have acted, or plan to act, to control combined sewer discharges and, as a result, have realized or expect to realize substantial benefits. Some of the methods of control (see app. III) used by municipalities include:

--Separation of storm and sanitary sewers.

--Storage of the excess combined sewer flows for later treatment at a sewage treatment facility.

--System control devices which monitor and reroute excess flows through the sewers to use the maximum capacity of the sewers to store the flows for adequate treatment before discharge.

--Treatment of combined sewer flows without storage, which usually involves some type of screening and chlorination.

Other municipalities, however, have not acted to control their combined sewer discharges.

The following examples illustrate the adverse effects of inadequately treated combined sewer discharges and the benefits that can be realized by their effective control and treatment.

EXAMPLE 1

In Rhode Island all municipalities on rivers flowing into a bay area had waste treatment facilities, but three municipalities (Providence, Central Falls, and Pawtucket) had combined sewers. During dry weather the water quality in most of the bay was adequate for harvesting shellfish.

Water samples taken from the bay after storms by the State water pollution control agency showed high bacterial counts, which a State official attributed to combined sewer discharges. Because of the high counts, the State closed 9,451 acres of the bay to shellfish harvesting following storms. Between March 1969 and October 1971, the State closed this bay area 38 times for a total of 190 days.

A Food and Drug Administration official advised us that most of the bay area probably would not have to be closed after storms if the largest of the three municipalities (Providence) controlled its combined sewer discharges. In 1967 the municipality estimated that it would cost $50 million to separate the sewers. A municipality official stated that this estimate had not been updated and that action had not been taken to determine the most economical solution to the municipality's combined sewer problems. A State official told us in December 1971 that the total cost of separating this municipality's sewers could be as high as $400 million.

EXAMPLE 2

Lafayette, Indiana, which had both separate and combined sewers, upgraded its treatment facility in 1969 at a cost of $2.75 million, of which $850,000 was financed by an EPA grant. The municipality did not provide for control over the combined sewer discharges. A Lafayette official told us that combined sewer discharges (1) lowered water quality below Federal-State standards, (2) caused unsightly conditions, which would detract from a planned riverside park, and (3) were harmful to fish. The municipality had not studied the best ways to control its combined sewer discharges.

EXAMPLE 3

In 1963 California ordered Napa to abate street flooding and discharging untreated sewage into a river. The river was nearly devoid of oxygen at its bottom and showed little evidence of vertebrates. In 1960 the river had been used extensively for fishing and such recreation as water-skiing and pleasure boating.

Napa's pollution problem was caused by inadequate treatment of wastes, discharges from combined sewers, and high ground water infiltration of separate sanitary sewers. A municipal official stated that during heavy rains the sewer flows increased from 5 million to 80 million gallons a day. Napa's treatment facility was able to handle about 8.5 million gallons a day.

A plan developed by an engineering firm provided for modifications to the treatment plant; separation of sewers; and construction of interceptor sewers, pumping stations, and holding ponds. Under this plan the total flow from the sanitary sewers would be treated and the storm water sewers would discharge directly into the river.

The cost to construct interceptor sewers, pumping stations, and holding ponds, which solved the infiltration problem, was about $4.5 million, of which about $1.5 million was financed by EPA. The cost of separation, which abated pollution from the combined sewer, was about $2 million, of which about $600,000 was financed by a HUD grant. Construction was completed in 1970.

In July 1972 the river was again being used for recreation.

EXAMPLE 4

Hammond, Indiana, adjacent to Lake Michigan, had both combined and separate sewers. The State required the municipality to stop its combined sewer discharges and to detain and chlorinate separate storm water flows before discharging them into the lake.

According to an EPA report dated April 1971, the combined sewer discharges from Hammond and those from nearby Whiting, Indiana, had directly affected two beaches (one in each municipality) and the water supplies of both municipalities. In the fall of 1971, Hammond, using its own funds, awarded contracts for separating its sewers, at a cost of about $733,000, and for constructing a facility to treat storm water, at a cost of about $617,000.

In its April 1971 report, EPA estimated that it would cost $3 million to stop the combined sewer discharges from Whiting. As of December 1971, Whiting had not determined the method by which it would control its combined sewer discharges. An EPA regional official told us that elimination of the combined sewer discharges into the lake from these municipalities would allow the opening of the two beaches, one of which had been closed for many years.

EXAMPLE 5

A metropolitan sanitary district serving about 5 million persons in Chicago provided secondary treatment of sewage but did not adequately control its combined sewer discharges. The State required the district to control its combined sewer discharges and, if necessary, to provide tertiary treatment by 1977.

The district has about 360 square miles served by combined sewers which have over 600 individual overflow points that discharge into 3 rivers. District officials estimated that the sewers discharged about 75 million pounds of suspended solids each year through the overflow points of the combined sewers, or almost half of the total suspended solids discharged to the rivers each year. The district's analyses showed that little improvement in water quality would result from constructing tertiary treatment facilities until the combined sewer discharges were controlled.

District officials estimated that separating combined sewers would cost as much as $4 billion and that an alternative, which involved underground tunnels and surface quarries for storage of excess flows, would cost $1.2 billion.

The district has been constructing underground storage tunnels on a limited basis. Tunnels costing an estimated $22 million were under construction as of December 1971. An EPA research demonstration grant of $1.5 million had been awarded to the district for assistance in constructing the storage tunnels.

- - - -

As the above examples show, combined sewer discharges are a major source of water pollution. These discharges must be controlled if Federal and State water quality goals are to be achieved; however, as discussed in the next chapter, Federal and State efforts to control such discharges have not been adequate.

CHAPTER 3

FEDERAL AND STATE EFFORTS NOT ADEQUATE TO CONTROL COMBINED SEWER DISCHARGES

Neither the Federal nor the State water pollution control agencies included in our review had adequately acted to control combined sewer discharges. They had concentrated primarily on abating and controlling industrial and municipal water pollution. Industrial and municipal waste treatment plants generally provide adequate treatment only for dry-weather flows. The lack of adequate attention to the problem of combined sewer discharges, which during and after heavy rains negate the water quality improvements resulting from the construction of treatment facilities, can be attributed primarily to the high cost of the potential solutions. In a 1967 study the American Public Works Association estimated the nationwide cost to be as high as $48 billion. In October 1972 EPA told us that, on the basis of the current construction cost index, the estimate had increased to $70 billion.

The States reviewed generally lacked adequate data on the scope of their combined sewer problems and on the costs and benefits of solving the problems, even though as early as 1966 the Federal Government required the States to consider the control of combined sewer discharges in their comprehensive plans for water pollution abatement.

Because most municipalities did not have programs for controlling combined sewer discharges, Federal agencies, as a condition for financing sewer construction, generally required municipalities to construct separate sewers. This construction, however, separated only a small part of the municipalities' combined sewers.

In some instances EPA has funded projects to abate discharges under its research, development, and demonstration grant program and its construction grant program. Generally, Federal funds have not been available for projects for controlling combined sewer discharges. Public Law 92-500, enacted October 18, 1972, authorized the appropriation of additional funds and provided EPA with additional authority to deal more effectively with the combined sewer problem, as discussed on page 27.

The following sections of the report discuss our findings at the State and local level and the related Federal efforts.

STATES LACKED ADEQUATE DATA ON COMBINED SEWER DISCHARGES

To know what is necessary for abating and controlling combined sewer discharges, State agencies must know the dimensions of the problem. Many municipalities in Massachusetts, Connecticut, Rhode Island, Illinois, and Indiana had combined sewers. In California, only Sacramento and San Francisco had significantly large areas with combined sewers. The State agencies did not have adequate data on (1) the scope of their combined sewer problems, (2) the alternative methods for controlling the problems and their costs, and (3) the benefits expected from control of the discharges.

Such data needs to be developed from studies of individual municipalities because the costs of solutions and benefits to be attained vary by location. Most municipalities had not made such studies even though, as far back as 1966, EPA required that they consider control of such discharges.

Pursuant to the Water Quality Act of 1965 (79 Stat. 903), the States are required to establish water quality standards for all interstate and coastal waters, including plans for implementing and enforcing the standards. In 1966 EPA issued guidelines to the States for developing the plans, which included the following reference to combined sewer discharges.

> The plan should include consideration of all relevant pollutional sources, such as * * * combined sewer discharges.
>
> * * * * *
>
> Standards will not be accepted which do not provide for abatement of all existing conventional municipal and industrial pollution within approximately five years. Remedial measures planned for more complicated pollution, such as that from combined sewer discharges, might reasonably be scheduled for a longer period; e.g., five to ten years.

In 1970 EPA again emphasized the need to consider controlling combined sewer discharges because the matter had not been adequately covered in the States' initial water quality standards.

The water quality standards of Illinois, Indiana, and California identified only a few municipalities with combined sewers and established individual compliance dates by which these municipalities were to control the discharges from their sewers. The standards of Illinois and Indiana required the remaining municipalities which had combined sewers to control their discharges either at the time of improvement of their treatment facilities or within 10 years. But State officials did not know the scope of the combined sewer discharge problem within their States.

Connecticut, Massachusetts, and Rhode Island did not require their municipalities to control combined sewer discharges even though such discharges represented a major pollution problem. The Massachusetts implementation plan required treatment facilities estimated to cost $650 million to be constructed but did not require any of its 57 municipalities with combined sewers to control their discharges.

State officials attributed the lack of consideration of this problem in their water quality standards plans to (1) their emphasis on requiring construction of treatment facilities to treat dry-weather flows, (2) a lack of data on costs, benefits, and solutions to the combined sewer problems of individual municipalities, and (3) the high cost and lack of Federal financial assistance.

We attempted to identify those municipalities in the six States reviewed that had severe combined sewer problems and had studied their problems. We had difficulty, however, in identifying municipalities that had studied their problems because the data was not readily available at the State level. Of the 17 municipalities reviewed, 16 had studied their combined sewer problems but only 10 had studied alternative solutions. The other six had not considered alternatives but had decided to separate their sewers. They had studied the problems solely to determine the best approach to separation.

For example, a 1964 engineering study by a consulting firm recommended that any new sewers for Hartford, Connecticut, be separate sewers, but it did not consider alternatives. The consulting firm told us that a new study should be made to properly determine the most effective and economical alternatives.

SOME MUNICIPALITIES SEPARATED THEIR SEWER SYSTEMS WITHOUT ADEQUATE CONSIDERATION OF ALTERNATIVES

Municipalities with combined sewers frequently contructed separate sewers when they constructed new sewers or when they rehabilitated or replaced existing sewers under Federal grant programs. These projects, undertaken without adequate study of alternatives, resulted in separation of only a small part of the municipalities' combined sewer systems.

In 1966 the House Committee on Government Operations expressed concern over the combined sewer problem and concluded that HUD and EDA grant funds should not be used for constructing combined sewers except in unusual instances, such as when municipalities had programs which would provide for adequate treatment of all combined sewer flows in the reasonably imminent future. Because most municipalities did not have such programs and had not studied their combined sewer problems, HUD and EDA have generally required since 1966 that projects involving sewer construction provide for separate sewers. Connecticut and Massachusetts also required municipalities constructing sewers to build separate sewers.

The comprehensive areawide development plans required under HUD programs and prepared by the municipalities reviewed usually contained only minor reference to combined sewer problems and did not contain information on potential solutions.

One municipality had replaced combined sewers with separate sewers in HUD urban renewal areas but had continued to build combined sewers in other areas when Federal financing was not available. As discussed in the following examples, this municipality and another included in our review constructed separate storm and sanitary sewers without adequately considering alternative solutions.

Example 1

Pawtucket, which has a population of about 77,000, had its sewage treated in a regional treatment facility. The municipality had combined sewers that discharged directly

into a river during storms and, as of December 1971, had neither studied nor had any plans to resolve the resulting water pollution problem.

Two HUD renewal projects have been completed in Pawtucket during the past 5 years. In both projects, combined sewers were replaced with separate sewers at a total cost of about $205,000, of which 75 percent was financed by HUD grants. During the same period, the municipality spent about $600,000 of its own funds to extend its sewer lines. Much of this construction was for combined sewers. Pawtucket officials stated that combined sewers had been constructed because Federal funds were not available for the sewer extension and separate sewers would have been more expensive.

A municipal official stated that complete separation of the sewers would depend on the availability of Federal financial aid. He estimated that separation would cost $17.5 million and said that doing the work over 25 years would cause the least disruption.

Example 2

Hartford has a population of about 160,000 and is on a major interstate river. A 1964 engineering study by a consulting firm stated that some of the municipality's combined sewers needed to be replaced because they were not large enough to handle the flow, which had increased over the years. The firm recommended that the new sewers be separate ones, but the study did not consider alternatives.

In February 1972 Hartford was expanding and upgrading its treatment facility at an estimated cost of about $32 million. The municipality had completed or had underway sewer separation projects having an estimated cost of about $12 million, of which about $2.3 million had been financed by Department of Transportation grants and about $2 million by HUD grants.

These projects separated only a minor portion of Hartford's combined sewers. According to a municipal official, separating all the sewers could cost as much as $200 million and would take about 30 years to complete at the present rate. The engineering firm told us that a new

study should be made to properly determine the most effective and economical alternatives.

Although separation is one means of dealing with combined sewer discharges, there are others. (See p. 11.) Because there does not appear to be any one solution that is best for all municipalities, the alternatives must be considered on a municipality-by-municipality basis.

Separation may not always resolve the problem. The separate storm sewer discharges are seldom treated and generally have been regarded as nonpolluting. Recent EPA studies, however, have shown that untreated storm water can pollute significantly. Although storm sewer discharges are much less polluting than combined sewer discharges, they contain high concentrations of organics, inorganics, bacteria, and floatable solids. These pollutants can result in lowered amounts of dissolved oxygen, bacterial contamination, aesthetic nuisances, and other adverse impacts on water quality and thus limit water use.

In addition, separation can be very costly in comparison with other methods. A 1967 study made by the American Public Works Association for EPA estimated that it would cost $30 billion to separate the Nation's combined sewers and an additional $18 billion to make related plumbing changes. In October 1972 EPA advised us that, according to the current construction cost index, the total estimated cost had increased to $70 billion.

The 1967 study estimated that it would cost $15 billion to control combined sewer discharges by alternatives. Included in the estimate was $1 billion for control of combined sewer discharges by the storage method for Boston and Lawrence, Massachusetts; San Francisco and Oakland, California; Hammond-Whiting; and Chicago.[1] In contrast, estimates for separation obtained from San Francisco and Chicago totaled about $6.2 billion.

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[1]As of December 1971 estimates for the storage method for the 6 municipalities had increased to $2.4 billion.

FEDERAL PROGRAMS NOT DIRECTED TO CONTROL OF COMBINED SEWER DISCHARGES

Because of limited funding authority, Federal grant programs have placed priority on the construction of waste treatment plants which can generally provide adequate treatment only for dry-weather flows. State officials told us that the lack of adequate Federal funding had limited progress in controlling combined sewer discharges.

As of April 1972, EPA, under its research, development, and demonstration program, had awarded 108 grants and contracts totaling about $36 million to develop and demonstrate methods to abate and control combined sewer discharges. Non-Federal funds for the projects totaled about $43 million.

Of the $36 million, grants of about $16 million were awarded to 26 municipalities for constructing storage facilities, but these solved only parts of their problems. For example, Chicago's construction of underground tunnels and surface quarries for storage of excess flows was estimated to cost $1.2 billion. As of December 1971, Chicago was constructing tunnels costing an estimated $22 million, for which EPA had provided a demonstration grant of $1.5 million.

Municipalities also have received little financial assistance for combined sewer projects under EPA's construction grant program. The Federal Water Pollution Control Act authorized construction grants to municipalities for treatment works necessary to prevent the discharge of untreated or inadequately treated sewage and other wastes. The act defined treatment works as

> * * * the various devices used in the treatment of sewage or industrial wastes of a liquid nature, including the necessary intercepting sewers, outfall sewers, pumping, power, and other equipment, and their appurtenances, and includes any extensions, improvements, remodeling, additions, and alterations thereof.

EPA officials told us that projects which did not result in treatment, such as projects to separate sewers, generally were not eligible for construction grants under the Federal Water Pollution Control Act. They told us also that,

because storm water was not considered sewage, a facility to treat only storm water was not eligible for a construction grant. EPA has funded some projects designed to control combined sewer discharges because the discharges included municipal or industrial wastes and construction of the project would result in treatment of the wastes. But because of the high cost of projects to control combined sewer discharges and the limited funds available for municipal waste treatment projects, EPA participation in such projects has been limited.

Boston had unsuccessfully sought a construction grant from EPA for a project to control its combined sewer discharges and thereby achieve recreational benefits. The municipality had a treatment facility that provided less than secondary treatment and discharged its effluent into an ocean harbor. Many of Boston's sewers were combined and discharged at different points into the harbor and into rivers flowing into the harbor. A preliminary engineering study recommended deep-tunnel storage, at a cost of about $400 million, as the best method to control the discharges.

The study recommended also an interim project that would result in the municipality's being able to eliminate, at a cost of about $15 million, the discharges into two bathing beaches adjacent to densely populated areas. The recommended interim project consisted of interceptor sewers to eliminate discharges to the beach areas by transporting the wastes to a point in the harbor where other sewer wastes were discharged. The interceptors were to be connected to the deep-tunnel storage facility in the future. The interim project did not provide for treatment of the wastes. Boston discussed the eligibility of the plans with EPA and was informed that a chlorination facility costing about $10 million would be required before the project could be eligible for a construction grant because it otherwise did not provide for waste treatment. An engineering firm official stated that the chlorination facility, which would provide less than secondary treatment, would not fit into the total plan for deep-tunnel storage and would probably be abandoned when such storage became available.

EPA regional officials stated that, since July 1971, secondary treatment facilities were required for dry-weather flows and, because the municipality did not have a secondary

treatment facility, it was questionable whether priority could be given to the combined sewer project. They stated that the question of priority of the project would have to be submitted to Washington for resolution. At the close of our review, the municipality had not applied to EPA for a construction grant for this $15 million project.

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As of January 1971 EPA plans showed that it had decided not to request funds for fiscal year 1972 for controlling discharges from combined sewers because its studies indicated that on a national basis the combined sewer problem ranked fourth or fifth in terms of seriousness among major pollution categories and that a program to control such discharges would not be cost effective. In March 1971, however, EPA requested its regional offices in the Great Lakes area to assess conditions there and submit recommendations for combined sewer projects that would provide immediate benefits. An EPA regional report, dated April 28, 1971, summarized eight projects that would show visible benefits within 3 years. These projects would result in the opening of bathing beaches and/or protecting of municipal water supplies.

In January 1972 EPA presented a special request for $100 million to the Office of Management and Budget (OMB) for a limited number of "high payoff" projects in the Great Lakes area to demonstrate that combined sewer discharges could be controlled in a logical and cost-effective manner. OMB rejected the request. In commenting on our report, OMB stated that "* * * there was insufficient evidence presented to demonstrate that the benefits from the proposed projects would offset the high cost."

BENEFITS AVAILABLE FROM PHASED CONSTRUCTION OF PROJECTS TO CONTROL COMBINED SEWER DISCHARGES

Control of combined sewer discharges is costly and could take many years to accomplish. Many municipal officials told us that without Federal or State financial assistance they could not finance such control. Many municipalities could achieve substantial benefits by abating combined sewer discharges under a program of phased construction. The construction could be accomplished over several years as funds became available. Such a program could provide for treating all polluting discharges, although the construction of treatment facilities may not be included in the early phases. In those cases where phased construction programs are developed by municipalities and approved by the States, EPA should consider awarding construction grants for the various phases. The following examples illustrate ways in which the abatement of combined sewer discharges might be accomplished in phases with benefits being realized before the total project is completed.

Example 1

San Francisco, on an ocean bay, recently completed a study ordered by the State regional water pollution control board and developed a master plan for its water pollution abatement needs. The cost of total separation of sewers was estimated at $2.2 billion.

The most economical method of abatement was estimated to cost $375 million, of which $333 million related to the abatement of combined sewer discharges. The plan, which included retention basins, underground tunnels, and a facility to treat combined sewer flows during storms, was divided into 16 separate phases so that the protection of water recreation areas could be emphasized first. The costs and a brief description of each phase are shown below.

Phase	Description	Costs (000,000 omitted)
1	Retention basins	$ 20
2	Outfall	30
3	Storage tunnel	15
4	Retention basins	12
5	Overflow treatment facility	33
6	Retention basins	27
7	Retention basins and storage tunnels	18
8	Retention basins	20
9	Storage tunnel	33
10	Overflow treatment facility (expansion)	14
11	Storage tunnel	12
12	Retention basins and force main	22
13	Retention basins	21
14	Storage tunnel	19
15	Overflow treatment facility (expansion)	16
16	Overflow treatment facility (expansion)	21
		$333

Completion of the first phase would eliminate combined sewer discharges in the northern part of San Francisco and allow recreational uses of the water. Completion of the first 7 phases, at a total cost of $155 million, would eliminate combined sewer discharges into all recreational water areas.

Municipal officials, who received the plan in September 1971, initially felt that the cost of the whole program was too high. In November 1972 a municipal official stated that the plan had not been fully approved.

Example 2

Bridgeport, Connecticut, on the shores of an ocean sound, had combined sewers that discharged at 53 separate points, either directly into the ocean or into streams and rivers which flow into the ocean. The municipality had two treatment facilities which were being enlarged and upgraded at a cost of about $26 million.

In 1967 the State ordered the municipality to study separation of its combined sewers. An engineering firm estimated the costs of separation at $114 million and suggested that a deep-tunnel storage project costing about $66 million would be the most cost-effective solution to the combined sewer problem. The recommended project would provide screening, sedimentation, and chlorination of combined sewer flows during storms. The firm's plan provided for construction in four phases.

Phase	Description	Discharge points controlled	Cost (millions)
1	Tunnel and overflow treatment facility	18	$26.4
2	Tunnels	18	13.2
3	Tunnel extension	10	13.2
4	Tunnel extension	7	13.2
		53	$66.0

The engineering firm stated that completion of the first phase would eliminate all 18 discharge points to a river which flows through the municipality and thereby improve the esthetics of the river and reduce the total pollution entering the sound.

The State agency has accepted the plan, subject to other actions required of Bridgeport. Municipal officials advised us that they had not adopted the plan because of the high cost and the lack of Federal and State financial aid.

LEGISLATIVE CHANGES RELATING TO COMBINED SEWERS

The Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) enacted October 18, 1972, included as goals that (1) the discharge of pollutants into navigable waters be eliminated by 1985 and (2) wherever attainable, an interim goal of water quality, which provides for protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water, be achieved by July 1983. If these goals are to be achieved, it is essential that pollution from combined sewers be controlled.

The law includes an expanded definition of treatment works eligible for construction grants as follows:

> * * * any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste including waste in combined storm water and sanitary sewer systems.

The law also (1) authorized $18 billion for fiscal years 1973-75 for Federal grants for constructing treatment facilities, (2) increased the Federal share of treatment facilities' construction costs, and (3) made eligible for Federal assistance such items as collection sewers, methods to deal with storm water runoff, projects to prevent combined sewer discharges, and studies of sewer systems and problems, which in the past had been considered ineligible for EPA financial assistance.

Furthermore, the law requires:

--The Administrator of EPA to publish guidelines for identifying those areas which have substantial water quality control problems.

--The Governor of each State to identify each area within his State which has a water quality control problem.

--The Administrator of EPA to require the States to study and evaluate the problems and alternatives before making grants available.

--The Grant applicant to submit plans, specifications, and estimates for each project to the Administrator for his approval.

CHAPTER 4

CONCLUSIONS, RECOMMENDATIONS, AND FEDERAL AND STATE COMMENTS

CONCLUSIONS

Combined sewer discharges are a major pollution problem and prevent many areas from attaining Federal and State water quality goals. These discharges have caused beaches near densely populated areas and shellfish-harvesting areas to be closed. Some communities which had acted to abate and control combined sewer discharges had obtained, or expected to obtain, important benefits, such as the recreational use of water.

Federal and State water pollution control agencies have placed little emphasis on abating and controlling combined sewer discharges, primarily because of the high cost.

In some instances, EPA has funded projects to abate combined sewer discharges under its research, development, and demonstration grant program and its construction grant program. Generally, however, Federal funds have not been available for projects to control such discharges.

The States generally lacked plans for abating and controlling combined sewer discharges. The States and municipalities did not have adequate information on the extent of the problem, alternative solutions and their costs, and the benefits to be obtained from abatement and control of such discharges.

Because most States and municipalities did not have programs for controlling combined sewer discharges, Federal agencies, as a condition for financing sewer construction, have generally required municipalities to construct separate sewers. These sewers were constructed, however, without considering alternatives and only a small part of the municipalities' combined sewer systems were separated.

Separation may not be the best answer in many cases because storm water can pollute significantly and because separation may not be the most cost-effective solution.

Thus States and municipalities should consider alternatives before deciding on the method of controlling discharges from combined sewers.

Although the costs to control such discharges are high, many municipalities could achieve substantial benefits by abating their combined sewer discharges in phases. The construction could be accomplished over several years as funds became available.

Public Law 92-500 (enacted October 18, 1972) increased the amount of funds authorized for EPA construction grants and made eligible for Federal financial assistance such items as collection sewers, methods or systems dealing with storm water runoff, projects to prevent combined sewer discharges, and studies of sewer systems and problems, which in the past had been considered ineligible for EPA financial assistance. This new law should enable EPA to deal more effectively with the combined sewer problem.

RECOMMENDATIONS TO THE ADMINISTRATOR, EPA

The Administrator, EPA, should require

--States to identify all municipalities having combined sewer discharges,

--States and municipalities to study the combined sewer problems and the alternatives available on a municipality-by-municipality basis, and

--States and municipalities to develop and submit plans to EPA for control and abatement of the polluting discharges, including phased construction programs.

We recommend also that the Administrator, EPA, consider awarding construction grants for phased construction projects.

FEDERAL AND STATE COMMENTS

In September 1972 drafts of this report were submitted to OMB, EPA, HUD, the Department of Commerce, and the water pollution control agencies of the six States reviewed.

Although written comments were not received from California, Illinois, and Indiana, State officials expressed general agreement with the findings in the report. Comments from OMB, HUD, the Department of Commerce, Connecticut, Massachusetts, and Rhode Island are presented in appendixes V through X.

By letter dated October 17, 1972 (see app. IV), EPA stated:

> We believe your report will be helpful in highlighting obstacles to the attainment of water quality goals for the United States as envisioned by the Environmental Protection Agency.

EPA also stated that many provisions of the Federal Water Pollution Control Act Amendments of 1972 were similar to the recommendations made in our report. EPA stated:

> Briefly, the legislation will make possible a more detailed consideration of the water pollution as affected by combined sewer discharges. Also it will authorize for the first time financial assistance for construction of facilities to control all such discharges, whether from combined sewers or from storm sewers. The actual execution of such work however, will depend on sufficient Federal funds being made available. With the new legislation and supporting appropriations as a basis, action in line with your recommendations to the Administrator and many others related to these problems will be taken by EPA.

The other recipients of the draft report generally agreed with our findings. We considered their comments in finalizing this report.

A number of the States stated that EPA should establish a separate construction grant program for abatement and control of combined sewer discharges. They stated that any additional funding made available by the Federal Water Pollution Control Act Amendments of 1972 would be

administered under EPA's construction grant program for waste treatment facilities and would be used primarily to continue upgrading waste treatment facilities, which historically have had a high priority.

CHRONOLOGY OF EPA AND ITS PREDECESSOR AGENCIES WHICH HAD RESPONSIBILITY FOR THE FEDERAL WATER POLLUTION CONTROL PROGRAM

1948--Division of Water Pollution Control established in the Department of Health, Education, and Welfare.

1954--Division of Water Pollution Control reduced to a branch and consolidated with other divisions into the new Division of Sanitary Engineering Services.

1959--Water Pollution Control Branch and other water pollution research and technical functions became the Division of Water Supply and Pollution Control.

1960--Division of Water Supply and Pollution Control grouped with other divisions to form the environmental health segment of the Bureau of State Services, Public Health Service.

1961--Research and training grants responsibilities under the control of the National Institutes of Health transferred to the Division of Water Supply and Pollution Control.

1965--Division of Water Supply and Pollution Control became the Federal Water Pollution Control Administration, a separate administration within the Department of Health, Education, and Welfare.

1966--Federal Water Pollution Control Administration transferred to the Department of the Interior in accordance with Reorganization Plan No. 2.

1967--Federal Water Pollution Control Administration reorganized.

1968--Federal Water Pollution Control Administration reorganized.

1970--Federal Water Pollution Control Administration became the Federal Water Quality Administration.

APPENDIX I

1970--Federal Water Quality Administration transferred to the Environmental Protection Agency, in accordance with Reorganization Plan No. 3, and became the Water Quality Office.

1971--Water Quality Office became the Office of Water Programs placed, with the Office of Air Programs, under the Assistant Administrator for Air and Water Programs.

APPENDIX II

MUNICIPALITIES REVIEWED

CALIFORNIA:
- Napa
- Oakland
- Sacramento
- San Francisco

CONNECTICUT:
- Bridgeport
- Hartford
- New Haven
- Norwalk

ILLINOIS:
- Chicago
- North Shore

INDIANA:
- Hammond-Whiting
- Lafayette

MASSACHUSETTS:
- Boston
- Lawrence
- Lowell

RHODE ISLAND:
- Pawtucket
- Providence

APPENDIX III

METHODS FOR CONTROLLING COMBINED SEWER DISCHARGES

Separation of sewers, storage with treatment, flow control, and treatment without storage are methods for controlling combined sewer discharges.

SEPARATION OF SEWERS

Separation of combined sewers, until recently, was the principal method used by the States to abate and control combined sewer discharges. The separated storm water was discharged, untreated, into a waterway and thus did not affect the flow of sewage to the treatment facility. Constructing separate sewers in the larger municipalities would, however, result in major and prolonged disruptions to traffic and other street activities and would interfere with other utilities where electric conduits, water and gas mains, and telephone conduits are installed beneath the streets.

Studies have shown that storm water runoff through separate sewers may carry considerable pollution. According to EPA, construction of separate sewers in expanding areas, with treatment of storm water where needed, may still be an acceptable solution. In these developing areas, the costs of separate sewers are lower than in established areas and disruptions are minimal.

STORAGE WITH TREATMENT

Storage facilities for the excess flows of storm runoff and sewage are of two main types. Where sufficient land is available, holding ponds, quarries, or holding tanks may be used to retain these flows. Where sufficient land is not available, such as in the major urban areas, underground storage may be used to retain the flows. One method of underground storage, the deep-tunnel concept, provides for cutting tunnels into underground rock where geological conditions permit.

Retention of the combined sewer flows makes it possible to provide treatment by periodic releases to the treatment facility as its capacity permits. If a level of treatment lower than that provided by the municipality's regular treatment facilities is acceptable, adding such treatment at the storage locations may be more advantageous, according to EPA.

SYSTEM CONTROL

By using automatic control devices within the sewer system to monitor and control sewer flows so that the full storage capacity of the sewer system is used, the volume and frequency of discharges can be reduced.

TREATMENT WITHOUT STORAGE

The development of this method has not been completely successful. Filter screening, or microstraining, wastes before discharge to remove solids appears to be one of the two most attractive methods, according to EPA. The second method, dissolved-air flotation, would use air to float the solids, which would then be skimmed from the surface. These techniques are not as advanced as the storage or system-control methods. Nevertheless, according to EPA, experience with demonstration projects has shown that combined sewer and separate storm water flows can be treated using these techniques to reduce the pollution load to the waterways.

APPENDIX IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

17 OCT 1972

Mr. Edward A. Densmore
Assistant Director
Resources & Economic Development Division
General Accounting Office
Room 1689, Parklawn Building
Rockville, Maryland 20852

Dear Mr. Densmore:

We have reviewed your draft report to the Congress, "Combined Sewer Discharges: A Problem Needing Attention:"

Many of the provisions of the Federal Water Pollution Control Act Amendments of 1972 parallel the suggestions made in your report, so our response is being made in terms of the new legislation.

Briefly, the legislation will make possible a more detailed consideration of the water pollution problem as affected by combined sewer discharges. Also it will authorize for the first time financial assistance for construction of facilities to control all such discharges, whether from combined sewers or from storm sewers. The actual execution of such work however, will depend on sufficient Federal funds being made available. With the new legislation and supporting appropriations as a basis, actions in line with your recommendations to the Administrator and many others related to these problems will be taken by EPA.

The following comments are offered on your recommendations:

(1) "that the EPA Administrator require the States to identify all municipalities having combined sewer discharges." Section 208(a)(2) of the amended Act states that "The Governor of each State, within sixty days after publication of the guidelines issued pursuant to paragraph (1) of this subsection, shall identify each area within the State which, as a result of urban-industrial concentrations or other factors, has substantial water quality control problems. . ." We will ensure that the identification of combined sewer discharges will be an essential part of such listing.

(2) "that the EPA Administrator require the States to study the problems and alternatives available on municipality-by-municipality basis." Section 201(g)(2) provides that "The Administrator shall not make grants from funds authorized for any fiscal year beginning after June 30, 1974, to any State, municipality, or intermunicipal or interstate agency for the erection, building, acquisition, alteration, remodeling, improvement, or extension of treatment works unless the grant applicant has satisfactorily demonstrated to the Administrator that--

> (A) alternative waste management techniques have been studied and evaluated and the works proposed for grant assistance will provide for the application of the best practicable waste treatment technology over the life of the works consistent with the purposes of this title; and
>
> (B) as appropriate, the works proposed for grant assistance will take into account and allow to the extent practicable the application of technology at a later date which will provide for the reclaiming or recycling of water or otherwise eliminate the discharge of pollutants."

(3) "that the EPA Administrator require the States to develop and submit to EPA plans for control and abatement of the polluting discharges." Section 203(a) includes the provision that "Each applicant for a grant shall submit to the Administrator for his approval, plans, specifications, and estimates for each proposed project for the construction of treatment works for which a grant is applied for under Section 201(g)(1) from funds allotted to the State under Section 205 and which otherwise meets the requirements of this Act. . ."

There are two additional major points which merit specific comment in the draft report. The first is the implication in the report that storm water runoff and combined sewer overflows are close equals in pollution. Actually storm runoff is much cleaner because the likelihood of high bacterial content, including pathogenic organisms, is much less than that in combined sewer overflows. In other words, from the standpoint of water quality, combined sewer overflows would have a much more deleterious effect than storm water runoff itself. This point is easily overlooked because both are high in volume and in the rate of discharge. A closely related factor is that when periods of high runoff to a water course occur, the natural flows in that water course are greatly increased and afford much more dilution.

The second item is the relative priority of providing treatment of domestic wastewater as opposed to the control of storm sewer discharges in a community. The final answer would be determined by a thorough engineering analysis of the situation for a community. However, in most of the United States, it would be expected that the

treatment of domestic wastewater would have a far greater effect on the long-term burden on the receiving water than the combined sewer discharges. The reason for this is that the treatment works provide elimination of a high degree of the most concentrated pollutional materials from a public health standpoint essentially 100 percent of the time, while control of combined sewer discharges is effective only for the limited periods of high runoffs. Again, the receiving water dilution effect mentioned in the previous paragraph operates to lessen the pollution effect. Such considerations would be an important part of the engineering evaluation of these and the many related problems impinging on the water pollution problem for a particular community.

The opportunity to make these comments on the draft of the report is greatly appreciated. We believe your report will be helpful in highlighting obstacles to the attainment of water quality goals for the United States as envisioned by the Environmental Protection Agency.

Thomas E. Carroll
Assistant Administrator
for Planning and Management

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

DEC 4 1972

Mr. Henry Eschwege, Director
Resources and Economic
Development Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

This is in response to your request for the Office of Management and Budget's comments on the General Accounting Office's proposed report to the Congress entitled, "Combined Sewer Discharges: A Problem Needing Attention."

The report notes that the Environmental Protection Agency recently proposed to establish a program to fund projects to abate combined sewer discharges under its research demonstration grant program and its construction grant program. The report further notes that the Office of Management and Budget rejected the proposal because of the high cost. However, there was insufficient evidence presented to demonstrate that the benefits from the proposed projects would offset the high cost.

The recently enacted Federal Water Pollution Control Act Amendments of 1972 address the Environmental Protection Agency's responsibility with respect to combined sewer discharges. The Office of Management and Budget will be working with the Environmental Protection Agency on this subject in the near future.

We appreciate the opportunity for review and comment.

Sincerely,

William A. Morrill

William A. Morrill
Assistant Director

APPENDIX VI

THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

November 29, 1972

Mr. Donald C. Pullen
Assistant Director
General Government Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Pullen:

My staff has reviewed the draft report entitled, "Combined Sewer Discharges: A Problem Needing Attention," and the following comment is provided:

The report at page 3 recognizes that separation may not be the best answer in all cases because storm water can be a significant source of water pollution and because separation may not be the most cost-effective solution. Thus, the report recommends that each municipality should consider the various alternatives available before deciding on the method of control of discharges from its combined sewers.

Under the newly enacted "Federal Water Pollution Control Act Amendments," EPA is authorized to make grants for the construction of municipal waste treatment facilities. This grant authority could be used for either the construction of separate treatment facilities for sewage and storm run-off or for the construction or enlargement of combined sewage facilities It is recommended that the last two sentences on page 3 of the report be expanded to suggest that EPA (and other agencies administering such grant programs) should require a thorough consideration of the alternatives to the handling of storm water flow prior to the exercise of its grant authority. The requirement of such considerations by EPA would enforce the evaluation of cost-effectiveness factors recommended by the GAO report.

We appreciate having the opportunity to review the report.

Sincerely,

Robert A. Podesta
Assistant Secretary
for Economic Development

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D. C. 20410

OFFICE OF THE ASSISTANT SECRETARY
FOR COMMUNITY DEVELOPMENT

OCT 31 1972 IN REPLY REFER TO:

Mr. B. E. Birkle
Associate Director, Resources and
Economic Development Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Birkle:

Your letter to the Secretary of September 13 transmitting the draft report: "Combined Sewer Discharges: A Problem Needing Attention" was referred to my office for review and comment.

My staff has reviewed the report and finds that the references to HUD's involvement in sewer construction projects under our Water and Sewer Program are adequately expressed. Our role in this matter is minimal and subject almost completely to the Environmental Protection Agency's determination as to the extent to which they would require more rigid pollution control compliance.

We agree with that portion of the report which indicates that the water pollution legislation will provide EPA with the additional funds and authority to deal more effectively with the combined sewer problem. The cost of such a program, however, is indeed high.

If we can be of any further assistance on this matter, please so advise.

Sincerely yours,

Floyd H. Hyde
Assistant Secretary

APPENDIX VIII

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

October 12, 1972

U. S. General Accounting Office
Room 1903, John F. Kennedy Federal Building
Government Center
Boston, Massachusetts 02203

ATTENTION: Mr. Joseph Eder,
Regional Manager

Re: GAO Draft Report
B-166506

Dear Sir:

This office has reviewed the Draft of Report to the Congress of the United States "Combined Sewer Discharges: A Problem Needing Attention". We concur with the conclusions and recommendations of the report, however, would like to stress the importance of actual separation as a program goal.

Connecticut has less than twenty (20) communities with some combined sewers. Overflow of sewage from these combined sewers does not occur in more than half of these communities. It is estimated that the problem of combined sewers can be isolated to three or four major urban centers by separation at a small fraction of the cost of the state program for secondary treatment facility construction.

Connecticut has a grant program for separation work, however the probability of federal support of such work has made it difficult to initiate real construction. We strongly advocate a federal grant program to support facility construction to control combined sewer overflow in major urban centers, and look forward to the probability that the "Federal Water Pollution Control Act Amendments of 1972" will provide the means to initiate separation programs where the problem is less massive in scope.

Detailed comments which are editorial or are not of major importance with respect to the recommendations or conclusions of the report have been provided directly to Mr. G. Johanson of your staff.

Very truly yours,

Robert B Taylor

Robert B. Taylor
DIRECTOR OF WATER COMPLIANCE
AND HAZARDOUS SUBSTANCES

RBT:lch
cc: G. Johanson
Brian Crowley

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OFFICE OF THE DIRECTOR
DIVISION OF WATER
POLLUTION CONTROL

The Commonwealth of Massachusetts
Water Resources Commission
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

October 6, 1972

Regional Manager
United States General Accounting
Office
John F. Kennedy Building
Boston, Massachusetts

Re: Draft report on combined
sewer discharges

Dear Sir:

The Division of Water Pollution Control has reviewed your draft report to the Congress of the United States on combined sewer discharges.

We find the report well prepared and in general, the Division concurs with the conclusions and recommendations contained therein. We are in complete agreement with your observation that benefits could be achieved with less than total control of the discharges through a program of phased construction, and with your recommendation that the Administrator of the Environmental Protection Agency consider awarding construction grants for various phases even those prior to construction of treatment facilities.

We believe that caution should be used in recommending that the Administrator should require the States to develop a plan for the control and abatement of all combined discharges because the alternatives are still being developed and evaluated. It is likely that most States do not have the manpower or resources to devote to the development and implementation of such a plan, especially in view of existing planning requirements contained in current Federal Legislation. Further, as indicated in your report, the total problem could involve urban storm water runoff as well as the combined sewer overflows. The development of a plan might not be feasible at this time. This is not to say that an inventory of all combined discharges should not be made.

Very truly yours,

Thomas C. McMahon
Director

TCM/JBC/bsr

APPENDIX X

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS • DEPARTMENT OF HEALTH

JOSEPH E. GANNON, M.D., M.P.H.
DIRECTOR

5 October 1972

Mr. Joseph Eder, Regional Manager
U. S. General Accounting Office
1903 John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. Eder:

A draft of the report to the Congress of the United States entitled "Combined Sewer Discharges: A Problem Needing Attention," No. B-166506, prepared by the Comptroller General of the United States, has been reviewed.

We are in general agreement with the contents of this report. The cost of correcting the problem created by discharges from combined sewers is of some magnitude, as pointed out by the report. Adequate means for abating the problem of discharge of combined storm and wastes from these sewer systems into our waters is not available except for complete separation at tremendous cost and inconvenience to our old cities.

It was a pleasure working with representatives from your office on this matter.

Yours very truly,

Carleton A. Maine

CAM:mn

Carleton A. Maine, Chief
Division of Water Supply and
Pollution Control
Department of Health

APPENDIX XI

PRINCIPAL OFFICIALS OF THE

ENVIRONMENTAL PROTECTION AGENCY RESPONSIBLE FOR

ADMINISTRATION OF ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
ADMINISTRATOR:		
William D. Ruckelshaus	Dec. 1970	Present
ASSISTANT ADMINISTRATOR FOR AIR AND WATER PROGRAMS:		
Robert L. Sansom	Apr. 1972	Present
Donald Mosiman	Feb. 1971	Apr. 1972